Coarray Fortran 2.0 for Blue Gene/Q

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Coarray Fortran 2.0 Overview

- Process subsets: teams
  - —like MPI communicators
- Topologies
  - —cartesian and graph
- Copointers
  - —point to remote data, array sections
- Synchronization
  - —events for point to point
  - —barrier, split-phase barrier
- Collective communication
  - —reductions, all-to-all, scatter, gather, ...
- Asynchronous operations
  - —copy
  - —collectives

CAF 2.0 Implementation

- Source-to-source translator
  - —use ROSE compiler infrastructure to translate CAF 2.0 into
    - Fortran 90
    - calls to CAF 2.0 runtime system
- CAF 2.0 runtime system
  - —built using GASNet runtime system
  - —potentially could be ported directly to PAMI
    - should be a natural mapping between CAF 2.0 constructs and PAMI processor subsets, collectives
- Commentary
  - —use IBM XL compilers to generate machine code for performance

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